

CLAIMS

What is claimed:

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1. An electronic assembly comprising:
- a board;
 - a plurality of contact terminals on an upper surface of the board;
 - an electronic device, including an integrated circuit;
 - a plurality of contact pads on a lower surface of the electronic device, each electrically connected to the integrated circuit;
 - a plurality of standoff members, each attached to a lower surface of a respective contact pad; and
 - a plurality of attachment layers, each located on a respective standoff member, having a lower melting temperature than a melting temperature of the respective standoff member, and being soldered to a respective upper surface of a respective contact terminal.

2. The electronic assembly of claim 1, further comprising:
- an electronic component mounted to a lower surface of the electronic device, the electronic component having a lower surface which is spaced from the upper surface of the board.

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3. The electronic assembly of claim 2, wherein the electronic component is located between the standoff members.

4. The electronic assembly of claim 2, wherein the electronic component is a capacitor.

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5. The electronic assembly of claim 1, wherein the melting temperature of the respective attachment layer is at least 30° C lower than the melting temperature of the respective standoff member.

6. The electronic assembly of claim 1, wherein the melting temperature of the respective attachment layer is below 232° C.

7. The electronic assembly of claim 1, wherein the respective attachment layer is selected from the group consisting of pure tin, a eutectic of tin and silver, and a eutectic of tin and copper.

8. The electronic assembly of claim 7, wherein the eutectic is a eutectic of tin and silver.

9. The electronic assembly of claim 1, wherein the respective attachment layer

is free of lead.

10. The electronic assembly of claim 1, wherein the respective standoff member is free of lead.

11. The electronic assembly of claim 1, wherein the respective standoff member is substantially spherical and the respective attachment layer substantially surrounds the respective standoff member.

12. The electronic assembly of claim 11, wherein each respective attachment layer is soldered to a respective contact pad.

13. The electronic assembly of claim 11, wherein the respective standoff member is between 0.5 and 0.8 mm in diameter.

14. The electronic assembly of claim 13, wherein the respective attachment layer is between 0.015 and 0.035 mm thick.

15. The electronic assembly of claim 11, wherein the respective standoff member includes a material selected from the group consisting of aluminum, bronze, a polymer, silver, and copper.

16. The electronic assembly of claim 15, wherein the respective standoff member is made of substantially pure copper.

17. The electronic assembly of claim 1, wherein the electronic device includes a package substrate, the integrated circuit being mounted to an upper surface of the package substrate.

18. An electronic assembly, comprising:

- a board;
- a plurality of contact terminals on an upper surface of the board;
- a package substrate;
- an integrated circuit mounted on an upper surface of the package substrate;
- a plurality of contact pads on a lower surface of the package substrate, each electrically connected through the package substrate to the integrated circuit;
- a plurality of substantially spherical standoff members; and
- a plurality of attachment layers, each located around a respective standoff member, having a lower melting temperature than the respective standoff member, having an upper portion soldered to a respective contact pad, and having a lower portion soldered to a respective contact terminal.

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19. The electronic assembly of claim 18, wherein the melting temperature of the respective attachment layer is at least 30° C lower than the melting temperature of the respective standoff member.

20. The electronic assembly of claim 19, wherein the respective standoff member includes a material selected from the group consisting of aluminum, bronze, a polymer, silver, and copper.

21. The electronic assembly of claim 20, wherein the respective attachment layers is selected from the group consisting of pure tin, a eutectic of tin and silver, and a eutectic of tin and copper.

22. A method of assembling an electronic assembly, comprising:
attaching a plurality of standoff components to respective contact pads of an electronic device, each standoff component having an attachment layer with at least a portion on a side thereof opposing the electronic device, the attachment layer being electrically connected through the contact pad to an integrated circuit of the electronic device and having a lower melting temperature than a melting temperature of the standoff component.

23. The method of claim 22, wherein a portion of the attachment layer is located

against the contact pad, heated and allowed to cool to attach the attachment layer and the standoff component to the contact pad.

24. The method of claim 22, further comprising:

locating the portion of the attachment layer against a contact terminal on a board;

heating the portion; and

allowing the portion to cool to attach the portion to the contact terminal.

Patent Application